ISSN (print) 0093 4666 © 2011. Mycotaxon, Ltd. ISSN (online) 2154 8889

MYCOTAXON

Volume 115, pp. 485 494 *January March 2011*

DOI: 10.5248/115.485

Hypogymnia irregularis (*Ascomycota: Parmeliaceae*)— a new species from Asia

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Abstract — *Hypogymnia irregularis* is newly described from southwest China, Nepal, Japan, and Taiwan. Similar in growth form to *H. vittata*, *H. irregularis* differs in always lacking soredia and having staggered, lateral, or almost randomly located perforations in the lower surface. In contrast, *H. vittata* usually produces soredia and has perforations more centered in the lower surface and axils. *Hypogymnia vittata* is known from Asia, North America, Central America, and Europe, while *H. irregularis* is endemic to Asia. *Hypogymnia irregularis* is postulated as being the fertile species that is the closest living relative to the sorediate *H. vittata*. Another Asian species, *H. stricta*, can be similar in appearance to *H. irregularis* and *H. vittata*, but can be differentiated both morphologically and chemically from those two.

Key words — *Lecanorales*, lichenized ascomycetes, lichenized fungi, Yunnan Province

Introduction

Since the last checklist of lichens in China (Wei 1991), numerous species of *Hypogymnia* from Asia have been described or revised (Chen 1994, Elix & Jenkins 1989, McCune et al. 2002, McCune & Obermayer 2001, Sinha & Elix 2003, Tchabanenko & McCune 2001, Wei & Bi 1998, Wei & Wei 2005, Wei et al. 2010). But still this center of diversity for *Hypogymnia*, particularly in southwestern China, holds additional undescribed species. This paper describes a species that can be one of the dominant lichens in the high-mountain *Abies* forests of southwest China and also occurs in Nepal, Taiwan, and Japan. The species has not previously been described because of its similarity to esorediate *H. vittata* and the recently resurrected *H. stricta* (Hillmann) K. Yoshida (Yoshida & Kashiwadani 2001). The new species was, however, keyed in McCune (2009) as "*H.* sp. undescribed, close to *H. vittata*."

Methods

Standard microscopy and chemical spot test methods were applied to over 600 specimens of *H. vittata* and closely related species, from throughout its range, including

417 specimens of *H. vittata* s. str. and 149 specimens of the new species described here. A total of 86 specimens belonging to the new species, 20 of *H. stricta*, and 92 of *H. vittata* s. str. were subjected to thin-layer chromatography (TLC), using standard methods of Culberson et al. (1981). Fragments of specimens were extracted in acetone at room temperature, spotted on aluminum-backed silica gel plates (Merck 5554/7 Silica gel 60 F_{254}), run in solvent systems A and C of Culberson et al. (1981), lightly brushed with 10% H_2SO_4, and charred in an oven at 100°C.

Taxonomy

Hypogymnia irregularis McCune, **sp. nov.** FIGURES 1, 2A–D

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Ab Hypogymnia vittata *differt sorediis absentibus, ascosporis 5–6 × 4–5 µm; foraminibus infernis irregularibus.*

TYPE: China: Yunnan Province, Jiaoxi Mountain, north of Kunming, 26.100°N 102.867°E, 3700 m, *Abies georgei* var. *smithii*–*Rhododendron* forest on slopes near hotel, on bark of *Abies*, Sept. 2000, *McCune 25576* (**holotype:** KUN; **isotypes:** H, HMAS-L, OSC, UPS, US)

ETYMOLOGY: *irregularis*, referring to the irregular arrangement of perforations through the lower surface.

THALLUS appressed to pendulous, to 10(–30) cm long, branching variable, including both isotomic and anisotomic portions, lateral budding often present; texture cartilaginous rather than papery; upper surface white to pale greenish gray, sometimes with dark mottles, sometimes with black borders, smooth to weakly rugose, epruinose; lobes 0.5–3(–4) mm wide separate to imbricate, often arcuate-recurved, width even to slightly expanding distally and near the nodes, sometimes ± pinched at the nodes; lobe width:height ratio 0.5:1 to 2:1; perforations present on many lobe tips, axils, and lower surfaces, the holes not rimmed; medulla hollow, both the ceiling and floor of the cavity soon darkening to brown or dark brown; soredia and isidia lacking; lateral budding or lobules occasional.

APOTHECIA common, substipitate to stipitate, to 9 mm broad, the receptacle urn or funnel shaped; stipe hollow; disk brown; spores small, subglobose, 5–6 × 4–5 µm; pycnidia common, brown to black; spermatia weakly bifusiform, 5–6 × 0.5–0.7 µm; photobiont chlorococcoid.

CHEMISTRY — By TLC the thallus contains atranorin and physodic acid, usually with 3-hydroxyphysodic and/or vittatolic acids (all four substances present in the holotype); cortex K+ yellow; medulla K– or K+ slow reddish brown, KC+ orange-red, P–. Of 86 specimens with TLC results, all had both atranorin and physodic acid, 70% had 3-hydroxyphysodic acid, and 91% had vittatolic acid. No attempt was made to distinguish atranorin from chloroatranorin.

SUBSTRATE — On bark and wood of both conifers (especially *Abies*, *Picea*, *Sabina*, *Pinus*, and *Tsuga*, in order of decreasing frequency) and hardwoods

FIG. 1. *Hypogymnia irregularis* habit and perforations. Arrows indicate examples of dorsal (D), lateral (L), and ventral (V) perforations (McCune 25576, holotype). Dorsal perforations are infrequent, lateral perforations occasional, and ventral perforations common. Scale bar 1 mm.

(especially *Rhododendron*, *Quercus*, *Sorbus*, and dwarf bamboo).

DISTRIBUTION — Very common and often locally abundant in southwest China, especially Yunnan and Sichuan Provinces; infrequent disjuncts in India,

Nepal, and Taiwan. In southwest China, where the species is most abundant, it occurs primarily between 3000 and 4400 m in elevation, in *Abies–Rhododendron* forests above the zone of hardwood dominance.

Brief characterization — Lobes free, short or long, often arcuate-tipped; long, slender, adventitious lobes often abundant; lobes 0.5–4 mm broad and internodes often 1–2 cm long; lobes somewhat pinched and swollen or smooth in profile; ceiling of cavity grayish brown to black; floor brownish black; similar to *H. vittata* but no soredia and perforations on lower surface irregularly arranged or staggered and partly lateral.

Selected specimens examined **China. Sichuan Province:** Er Mei Mt., 29.5°N 103.33°E, 2100 m, *Tao De Din 1415* (KUN); from Ping Wu Co to Jui Zhai Guo, 29.53°N 104°E, 3100 m, *Wang Li-song 86-2511a* (KUN); Xinxing Co.: Gongga Mt, Yen Zi Village, 29.67°N 102°E, 3350 m, *Xuan Yu 1378* (KUN); Kangding Co. (as Sikang: Kangting (Tachienlu), montes orientalis), *Harry Smith, s.n.* (UPS); Luding Co.: Gongga Mt, Yen Zi Village, 29.67°N 102°E, 3250 m, *Xuan Yu 1377* (KUN); Gongga Mt., Hai Luo Gou, 29.833°N 102.33°E, 2450 3000 m, *Wang Li-song 96-16111, 96-17030, 96-16295b, 96-16213* (KUN); Gongga Mt, 29.42°N 101.83°E, 3000 m, *Wang Li-song 96-17242* (KUN); Mi Yi Co., Ma Long Village, Bei Puo Mt., 26.83°N 102°E, 3100 3600 m, *Wang Li-song 83-775 , 83-798, 83-829* (KUN); Muli Co., E slopes of Ning Lang Mt., 27.83333°N 101.1667°E, 3900 m, *Yuan Yu 1845* (KUN); Ning-lang village, 27.23°N 100.87°E, 3900 m, *Xuan Yu 4268b* (KUN); from Yi Qu to Wo Ya, 27.83°N 101°E, 2700 3500 m, *Wang Li-song 83-2364, 83-2365* (KUN); W slope of Ning Lang Mt., 27.83°N 101.17°E, 4000 m, *Xuan Yu 1798* (KUN); Ya Zhuei forest sta., Jiang Du, 27.83°N 101.33°E, 3450 m, *Wang Li-song 83-1580* (KUN); Yi Qu, 27.83°N 101°E, 3200 3700 m, *Wang Li-song 83-2341, 83-2400* (KUN); Nanping Co., Jiu Zhai Gou, 33°N 103.83°E, 2050 3200 m, *Wang Li-song 86-2725,86-2627, 86-2660* (KUN); Wenchuan Co.: Wo Long Nature Preserve, 30.9°N 103.1°E, 3200 m, *Wang Li-song 96-17683* (KUN); Yanyuan Co., Beiling Village, Si Da Unit, 27.5°N 101.5°E, 3500 3800 m, *Wang Li-song 83-1435, 83-1464* (KUN); Daling Village, Huo Lu Mt., 27.5°N 101.5°E, 3500 4150 m, *Wang Li-song 83-1149, 83-1175a, 83-1196, 83-1211, 83-1258, 83-1398* (KUN); **Xizang (Tibet):** Chayu Co.: Cawarong, Song Ta Xue Mt, 28.67°N 97.83°E, 3500 m, *Wang Li-song 82-801, 82-805* (KUN); Gyala Peri N, W above Gyala Peri-N Glacier, 29.9°N 94.87°E, 3820 m, *Miehe, G. & S. 94-215-42/10* (GZU). **Yunnan Province:** Caojian Co., Zi ben Mt, 25.737°N 99.058°E, *Wang Li-song 00-18901, 00-18910, 00-18913* (KUN); Dali Co.: Xiao Lin Feng, 25.717°N 100.13°E, *Wang H.-c. 4825b* (KUN); Long-quan-feng Mt., 25.2°N 100.95°E, *Wang Han-che 4364* (KUN); top of Long Quan Feng Mt., 25.717°N 100.133°E, *Wang H.-C. 1067, 4360* (KUN); Yu Jiu Feng, 25.63°N 100.1°E, 3000 m, *Sauer 30.154b* (KUN); trail to Mt. Cang, 25.685°N 100.102°E, 3500 m, *McCune 26772, 26775, 26779, 26780, 26787, 26803, 26806, 26795, 26797* (OSC); Deqin Co.: Bei Ma Xue Shan, Ya Kou, 28.383°N 99°E, 4300 m, *Wang Li-song 93-13489* (KUN); Meilishi village, Suola Ya-Kou, 28.63667°N 98.61333°E, 4000 4750 m, *Wang Li-song 00-19742, 00-19766* (KUN); Mei Li Xue Mt, Xio-Nang Village, 28.4°N 98.75°E, 3400 m, *Wang Li-song 94-15041* (KUN); Fu Gong Co.: Lu Ma Den Village, Qu Lu Di unit, 27.033°N 98.883°E, 3500 m, *Wang Li-song 82-448* (KUN); Gong Shan Co., Binzhong Luo to Tong Da Ya Kou, 93.683°N 28.092°E, 3800 m, *Wang Li-song 99-18510* (KUN); Qinatong, Songtaxue Mt., 28.1883°N 98.5317°E, 3200 m, *Wang Li-song 00-19613, 00-19615, 00-19619, 00-19628* (KUN); Yen Niu Gu, 27.801°N 98.825°E, 2950 m, *Wang Li-song 00-19364, 00-19377* (KUN); Binzhong Luo village, 27.96667°N

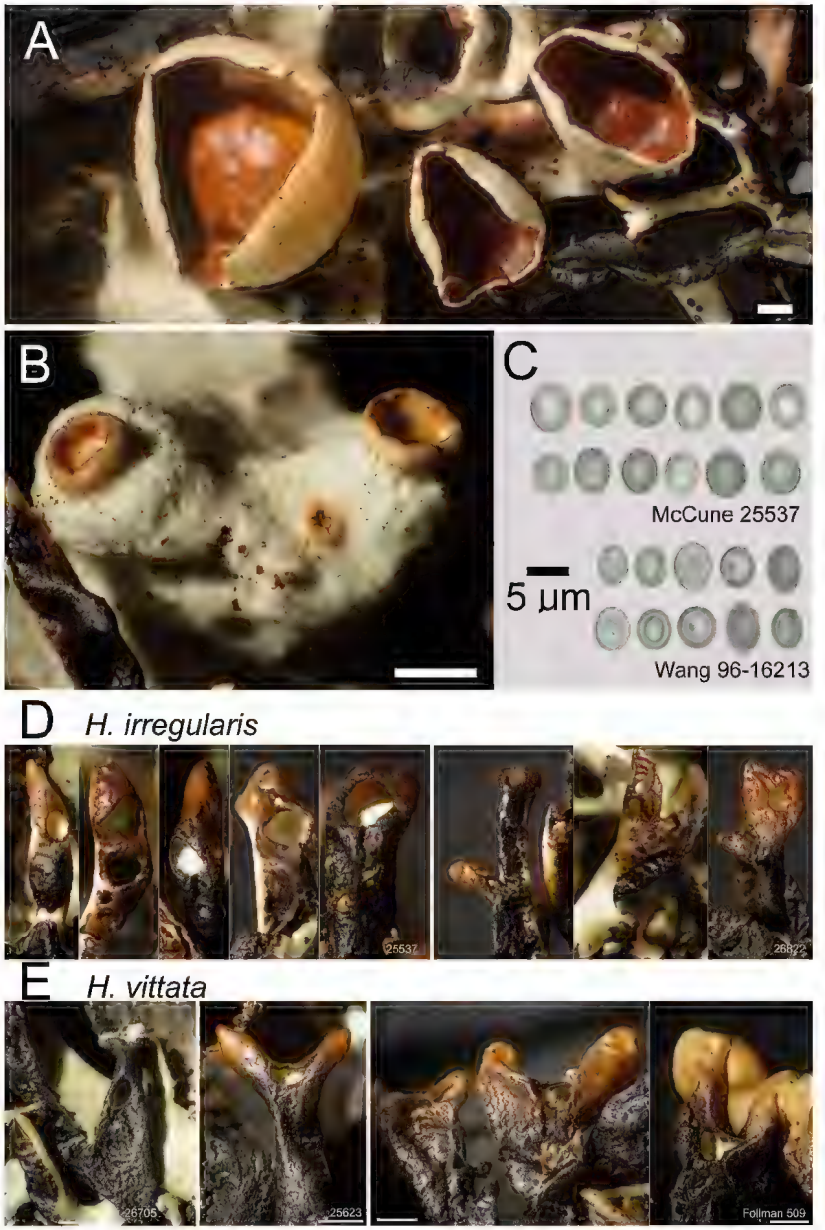

FIG. 2. *Hypogymnia irregularis*. A. Apothecia (McCune 25576; scale bar 1 mm.); B. Young apothecia (McCune 25576); C. Ascospores (Wang 96-16213; McCune 25576). D, E. Comparison of position of perforations in the lower surface of *Hypogymnia irregularis* (D) and *H. vittata* (E). Collection numbers are indicated below photos.

98.51667°E, 3600 m, *Wang Li-song 82-741* (KUN); JIANCHUAN CO.: ridge on trail to Laojun Shan, 26.6317°N 99.7183°E, 3980 m, *McCune 26728, 26729* (OSC); San Jiang Bin Liu area, 26.6625°N 99.7217°E, 3110 m, *McCune 26703* (OSC); trailhead to Laojun Shan, 26.6322°N 99.7253°E, 3700 3800 m, *McCune 26707, 26715* (OSC), *Wetmore 88456* (MIN); LIJIANG CO.: Jiushijiulongtiam Lake, Maan Mt., 26.6517°N 99.775°E, 3500 m, *Wang Li-song 00-20085, 00-20094, 00-20101, 00-20223* (KUN); Jiutte Villate, Laojun Mt., 26.65°N 99.77°E, 4000 m, *Wang Li-song 99-18732* (KUN); Laojun Mt., Jiushijiulong Lake, 26.6317°N 99.7283°E, 3800 4100 m, *Wang Li-song 00-19820, 00-20252, 00-20257, 00-20278, 00-20288, 00-20289, 00-20319, 00-20324* (KUN); Li-di-ping, 26.85°N 100.267°E, 3200 m, *Xi Jian-xun 0165, 0169a* (KUN); Yu Long Xue Mt., 27.083°N 100.167°E, *Li Xin-jiang 1494* (KUN); Lijiang area ("Likiang"), *J. F. Rock 115b* (US); eastern slopes Likiang Snow Range, *Rock,J.F. 11779* (US); LUQUAN CO., Jiaoxi Mt., 26.083°N 102.133°E, 3700 4300 m, *Wang Li-song 92-12856, 92-12857, 92-12869, 92-12879, 92-12949, 92-12950, 96-16725, 96-17060, 96-17066 Fan Rei Zhen 3220* (KUN); Jiaoxi Mt., N of Kunming, 26.100°N 102.867°E, 3500 3750 m, *McCune 25517, 25518, 25528, 25537a, 25537b, 25588, 25600, 25606, 25631, 25653* (OSC); WEI XI CO.: Li-di-ping Village, 27.167°N 99.417°E, 3200 m, *Wang Li-song 82-7* (KUN); Ye Zhi Village, Ba-ding, 27.8°N 99.03°E, 3500 m, *Wang Li-song 82-264a, Zhang D.-C. 82-83* (KUN); YUNLONG CO.: Zi Ben Shan, top of ridge, 25.733°N 99.067°E, 3200 m, *McCune, 26822* (OSC); Xiao Zhongdian, Ji Sha, 27.417°N 99.733°E, *Den Kun-Mei 81-1679* (KUN); Daxue Mt., 28.503°N 99.817°E, 3800 m, *Wang Li-song 00-19824* (KUN); Daxue Mt., Ya Kou, 28.667°N 99.834°E, 4270 m, *Wang Li-song 93-2751* (KUN); Daxue Mt., 28.567°N 99.817°E, 4400 m, *Wang Li-song 01-20740, 01-20796, 01-20800* (KUN); Daxue Mt., 28.579°N 99.821°E, 3350 m, *Watson, M. F. 18* (E); Na Pa, Hai Hou Mt., 27.833°N 99.717°E, 3860 m, *Wang Li-song 93-13742* (KUN); Tianchi (alpine lake), 27.833°N 99.717°E, 3700 m, *Wang Li-song 94-14929* (KUN); Tianchi Lake, 27.617°N 99.633°E, 3900 m, *Wang Li-song 01-20888* (KUN); Wengshuei Village, Daxue Mt., 28.575°N 99.83417°E, 4000 m, *Wang Li-song 00-20026, 00-20032* (KUN); Xiozhongdian, Tianchi, 27.833°N 99.717°E, *Wang Li-song 93-13683d, f, g* (KUN). **JAPAN. HONSHU**: Prov. Shinano, betw. Shibunoyu Hot Spring & Kuroyuridaira, 2400 m, *Kashiwadani, Lich. Rar. Crit. Exs. 478* (BM, S, US, WIS); Prov. Kai, lower slopes on N side of Mt Fuji, near Okuniwa, between 4-gome and 5-gome, 2250 m, *McCune 26062, 26069* (OSC). **NEPAL.** Rolwaling Himal: Mt. Numbur, 3400 m, *Yoda 130* (TNS); S of Kyangen Gompa, Birch wood, 28.2037°N 85.558°E, 3852 m, *Sharma et al. L10* (E). **TAIWAN**: TAICHUNG CO., Between Ssu-yuan & To-chia-tun Mt., Nanhuta Mt., 2700 m, *Kashiwadani 36156* (TNS); Nanhuta Mt., 3000 m, *Tateishi* s.n., *12 Sep 1984* (TNS); Nantou Co., Mt. Yu Shan, Tartaka Saddle to Paiyun Hostel, 3000 m, *Lai 10325* (US); Toroko NP, Hehuan Mt, 3200 m, *Mikulin T5* (OSC), 2756 m, *Mikulin T72* (OSC).

Hypogymnia vittata (Ach.) Parrique

FIGURE 2E

SPECIMENS ILLUSTRATED OR MENTIONED **AUSTRIA.** Kärnten: Gurktaler Alpen, Severgraben, E von Gnesau, ca. 800 m, 46°48'N 14°4'W, on *Alnus incana*, 27 Oct 1998, *Zeiner 151* (GZU, fertile); E Tyrol, southern foothills of Hochvenediger Mts., Follman, Lich. exs. sel. 509 (OSC). **CHINA. YUNNAN PROVINCE**: Jiaoxi Mt., north of Kunming, 26.100°N 102.867°E, 3700 m, *McCune 25623* (OSC); Jianchuan Co., San Jiang Bin Liu area, road to Lao Juen Shan, 3110 m, *McCune 26705* (OSC). **FINLAND.** Uusimaa: Espoo, Nuuksio (Nouks), Hankalahti (Hanklaks), Ahvenlampi, rock face (kallioseinällä), 21 Oct 1934 *K. Linkola* (H, fertile). Pohjois-Savo (Savonia borealis): Kuopio, Enonlahti, Enonmäki, rock face (kallion kylessä), 14 Jul 1909 *K. Linkola* (H, fertile). **MEXICO.** Estado de Oaxaca: mountain tops ca. 6 km NW of Ixtlan de Juarez, 2865 m, Esslinger 18225C (NDA).

Discussion

Hypogymnia irregularis often shows an extreme range in lobe width and length, all in the same thallus (Fig. 1), but it is generally more robust than *H. vittata*, with lobes commonly >2 mm wide and internodes >9 mm long. The arrangement of the perforations in *H. irregularis* can vary even within a single specimen from a staggered arrangement of semi-lateral holes to a linear arrangement of holes centered on the lobes, or even lateral or dorsal holes (Figs 1, 2D).

Both *Hypogymnia irregularis* and *H. stricta* (Yoshida & Kashiwadani 2001; lectotype: TNS!) appear similar to esorediate individuals of the normally sorediate *H. vittata* (type: BM! as *Parmelia physodes* var. *vittata* Ach.). Differences among these species are discussed below.

Hypogymnia stricta is currently known from China, Japan, and Taiwan. In *H. stricta* the ceiling of the lobe cavity is light brown to white (rarely dark brown), the upper cortex has faint to prominent transverse cracks, and the thallus contains 2′-*O*-methylphysodic acid (see below). In contrast, both *H. irregularis* and *H. vittata* have consistently dark ceilings, except for a whitish ceiling very near the lobe tips. The perforations of *H. stricta* are similar to *H. vittata*, being rather large and ± centered along the midline of the lower surface of the lobes, both of those differing from the irregularly placed holes in *H. irregularis* (Fig. 2D).

The ascospores of *H. stricta* average 5.5–7.0 × 4.5–5.0 µm, slightly longer than those of *H. irregularis* which are mostly 5.0–6.0 × 4.0–5.0 µm. The spore sizes of *H. irregularis* broadly overlap with *H. vittata*. Fertile specimens of *H. vittata* are rare. Two specimens from Finland had ascospores (4.8–)5.0–6.0 (–6.5) × 4.8–5.2(–5.4) µm, similar to Bitter (1901): 4.5–5.8 × 4.5–5.0 µm. A fertile specimen from Austria was barren of ascospores.

Separation of esorediate *H. vittata* from *H. irregularis* must rely on the pattern of the perforations in the lower surface and the presence and abundance of pycnidia. Although *H. vittata* typically has large, sparse perforations that are nearly centered in the lower surface or axils (Fig. 2E), *H. irregularis* has more frequent and smaller perforations that are often lateral, irregular in placement or sometimes staggered from side-to-side (Figs 1, 2D). This character is not, however, perfect. Even on a single individual of *H. irregularis*, one can observe some lobes with centered perforations and others with staggered perforations. And some specimens of *H. irregularis* have mainly centered perforations. Conversely, *H. vittata* sometimes forms perforations that deviate somewhat from the midline.

Almost always *H. vittata* has no pycnidia or only a few, widely scattered pycnidia, while *H. irregularis* usually has dense swarms of pycnidia on many lobes.

Because *H. irregularis* is restricted to Asia, it is not necessary to separate *H. vittata* from *H. irregularis* in most of the World. *Hypogymnia vittata* is known from Europe, North America, Central America (Mexico), and Asia south to New Guinea.

Some specimens from Japan are problematic. There it is common to find specimens close to *H. vittata* but without soredia and without the irregular perforations of *H. irregularis*. Perforations in the lower surface tend to be large and centrally aligned. In contrast to usual *H. vittata*, the esorediate Japanese material often has dense swarms of pycnidia, suggesting a closer affinity with *H. irregularis*. The ultimate disposition of this material requires further study; for now, it is placed in *H. irregularis*.

Hypogymnia stricta typically contains atranorin, physodic, 3-hydroxyphysodic, and 2′-*O*-methylphysodic acids (20 specimens with TLC data). Thus it has a medulla K+ slow reddish brown, KC+ orange red, and P–. *Hypogymnia irregularis* can have the same spot tests, or it can be K– when lacking 3-hydroxyphysodic acid. However, 2′-*O*-methylphysodic acids was not found in *H. irregularis* by TLC, while this substance appears to be constant in *H. stricta*.

Hypogymnia vittata is essentially the same as *H. irregularis* in frequency of substances by TLC. Of 92 specimens of *H. vittata* with TLC data (worldwide), all had both atranorin and physodic acid, 85% had 3-hydroxyphysodic acid (vs. 70% in *H. irregularis*) and 84% had vittatolic acid (vs. 91% in *H. irregularis*). Both species often show an unknown spot just under vittatolic acid in solvent C, and both commonly have long-wave UV+ unknowns in Culberson's Rf classes A5 and C6. Both species show pronounced quantitative variation in vittatolic acid, ranging from a trace (or not detected) to an obvious major substance.

The *Hypogymnia vittata* complex (Table 1) should prove a fascinating subject for molecular systematics. All species in this group have large ventral perforations that lack a raised differentiated rim, predominantly dark lobe interiors, narrow perpendicular adventitious branches, and a P– medulla (lacking physodalic and protocetraric acids). The common *H. physodes*, while similar to *H. vittata* in the soralia lining splayed open lobe tips, differs in the absence of perforations (other than those associated with soredia), the absence of narrow adventitious branches, and the P+ orange-red medulla from physodalic acid.

All species in the *H. vittata* group are Asian, except for *H. vittata*, which has spread to other continents. Like other species pairs in *Hypogymnia* (*H. lophyrea* (Ach.) Krog and *H. hultenii* (Degel.) Krog; *H. krogiae* Ohlsson and *H. incurvoides* Rass.; Miadlikowska et al. 2011), this can be considered another case of the fertile species having a narrower distribution than the sorediate counterpart.

TABLE 1. Summary of characters of *Hypogymnia vittata* and related species.

Hypogymnia species	ASEXUAL REPRODUCTION	APOTHECIA	CEILING OF LOBE CAVITY	VITTATOLIC ACID	2′ *O* METHYL PHYSODIC ACID
irregularis	none	common	dark	usually	no
pectinatula	none	not seen	dark	no?	no?
pseudobitteriana	laminal soredia, schizidia	rare	dark	seldom	no
stricta	none	common	pale	no	usually
vittata	labriform soredia	rare	dark	usually	no
zeylanica	isidia bursting into soredia	rare	dark	no	no

All have narrow perpendicular adventitious branches, are P (lacking physodalic and protocetraric acids), have non rimmed perforations in the lower surface. Only a small number of *H. pectinatula* have been tested by TLC, so chemical substances are uncertain.

In addition to the species discussed above, other apparently close relatives of *H. vittata* have a diversity of reproductive modes (Table 1): *H. pseudobitteriana* (D.D. Awasthi) D.D. Awasthi (widespread in eastern and southern Asia) has laminal schizidia and soredia; *H. zeylanica* (R. Sant.) D.D. Awasthi & Kr.P. Singh (Sri Lanka) has isidia and pustular soredia; and *H. pectinatula* (Zahlbr.) Elix (Papua New Guinea, Java, Philippines, and North Borneo) has a frondose growth form with abundant lateral budding but no other asexual propagules. All of these share with *H. vittata* a perforate lower surface, dark ceilings and floors of the lobe cavity, absence of 2′-*O*-methylphysodic, physodalic, and protocetraric acids (medulla P–), and a tendency to produce slender perpendicular adventitious branches. From this group I exclude those species with a raised, differentiated rim around the perforations (McCune et al. 2002), such as the superficially similar *H. diffractaica* McCune. Last, *H. subduplicata* (Rass.) Rass., a sorediate species described from Far East Russia, is very similar to *H. vittata*. The chemistry of the type needs to be determined and the morphology compared with *H. vittata*.

Acknowledgments

We thank curators of ASU, BM, CANL, COLO, DUKE, E, GZU, H, HMAS-L, KUN, MIN, MSC, NY, OSC, PC, S, TNS, UBC, UPS, US, and WIS who kindly cooperated with loans and visits; and to Ted Esslinger and André Aptroot for sharing personal collections. I greatly appreciate Wang Li Song sharing his voluminous collections and cheerful hospitality during two extended visits, Hiroyuki Kashiwadani, Kozo Yoshida, and Svetlana Tchabanenko for sharing their collections and knowledge of *Hypogymnia*, and Olivia Lee for translating label data and assisting with data entry. Elisa Alphandary, Lalita Calabria, Erin Martin, and Christina Wesseler assisted with TLC. Thanks to Walter Obermayer and Arve Elvebakk for reviewing the manuscript and to Teuvo Ahti for helpful suggestions.

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